PREGNANT WOMEN WITH LOW BMI (<19); FREQUENCY OF PRETERM LABOUR AND LOWBIRTH WEIGHT

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ABSTRACT... Introduction: A strong relationship between maternal weight and birth weight has been demonstrated consistently and low maternal weight is considered as a preventable risk factor for low birth weight. **Objectives:** To determine the frequency of preterm labour and fetal outcome in terms of low birth weight in pregnant women with low body mass index < 19. **Study Design:** Descriptive case series. **Setting:** Outpatient Department of Obstetrics and Gynaecology, Combined Military Hospital, Quetta, a tertiary care hospital. **Duration of study:** Six months from 01-05-2009 to 01-11-2009. **Subjects and methods:** Total 114 pregnant women at 16 weeks of gestational age with singleton pregnancy reporting to obstetrics and Gynaecology Department Combined Military Hospital, Quetta were selected. **Results:** Mean age was observed 27.6±3.9 year. Out of total 114 patients, 15 (13.1%) belonged to <37 weeks of gestation while 99 (86.9%) patients had >37 weeks gestation. Mean gestational age observed 38.5±4.1. Out of 15 preterm deliveries, 10 (66.7%) had uterine contractions >4/10 min 5 and (33.3%) patients had Cervical dilatation >2cm. Out of 114 patients, 12 (10.5%) cases had fetal weight <2.5 kg and while remaining 102 cases (89.5%) had fetal weight 2.5-4 Kg. **Conclusions:** In conclusion, this study demonstrates that low BMI is associated with preterm delivery and low birth weight babies.

Key words: Preterm labour, Low birth weight, Low body mass index

INTRODUCTION

Maternal nutritional status is important for health and quality of life in women and their growing fetus. A strong relationship between maternal weight and birth weight has been demonstrated consistently and low maternal weight is considered as a preventable risk factor for low birth weight. In women with body mass index less than 19, mean birth weight of newborn was significantly low (P<0.05). It is showed that being moderately underweight was not associated with increased risk of pregnancy outcomes for being severely underweight was important risk factor for reduced fetal growth. There were 7.3% preterm deliveries and 6.4% low birth weight newborns in women with low body mass index[1].

A low pregnancy body mass index is one of strongest predictors of adverse pregnancy outcome. Although pregnancy body mass index has a genetic as well as nutritional component, a low pregnancy body mass index is considered a marker for minimal tissue nutrient reserves. Women with low pregnancy weight for height or body mass index are at increased risk for a number of adverse pregnancy outcomes like an infant that was smaller or of lower birth weight than infants born to women with either a normal or high body mass index[2].

Underweight women were also found to have a greater incidence of preterm birth (32-37 weeks) and preterm labour (12.1%). In women with low body mass index there is reduction of 9.5% in birth weight[3].

The most important established determinants of restricted fetal growth Western in settings, are cigarette smoking, are low pre pregnancy body mass index and low gestational weight gain[4].

Maternal diet is an important determinant of outcomes of pregnancy malnutrition during pregnancy and its consequences maximally affect the health and long term outcomes of the population. Low birth weight accounts for almost 30% of all births, with maternal malnutrition as a risk factor[5].

Preterm infants experience neurological, respiratory, cardiovascular and other problems as the result of premature birth. Infants that are SGA experience different problems that are related more to their growth restriction, such as nutritional and metabolic problems, and may manifest neurological problems as a result of the growth restriction incurred in utero[6]. Infants that were both preterm and SGA, approximately 12% of all preterm births in Utah in 1989-1997, suffered from problems associated with both conditions, including a greater risk for infant mortality compared to their term counterparts[7].

Low birth weight increases the risk for infant mortality and morbidity. Infant mortality increases with decreasing birth weight[8]. Infant mortality rates were 228.5 per 1,000 live births for those born weighing less than 1500 grams, 19.9 per 1,000 live births for infants weighing between 1500-2499 grams compared to 3.4 per 1,000 live births for those weighing normal weight at birth. Low birth weight infants often require intensive care at birth, may develop chronic illnesses, and later may require special education services[9].

The aim of this study is to document the effects of low body mass index in pregnant women in terms of preterm labour and its fetal outcome in terms of low birth weight, in patients reporting to Obstetrics and Gynaecology Department, Combined Military Hospital, Quetta. Our study will help us to find what is the ideal body mass index for healthy pregnancy so as to prevent complications like preterm labour, low birth weight, and advising women regarding nutrition and maintaining normal body mass index for future pregnancies.

OBJECTIVES

Objective of the study was

To determine the frequency of preterm labour and fetal outcome in terms low birth weight in pregnant women with low body mass index < 19.

Operational definitions

Body Mass Index (BMI)

The body mass index is person's weigh in kilogram divided by their height in meters squared. 19.5 or less (underweight), 19.5-24 (normal) 25-29.9 (overweight) 30-34 (obese).

Preterm Labour

Preterm labour refers to the onset of labour after the gestation of viability and before 37 completed weeks or 259 days of pregnancy.

Diagnosed on the basis of:

A. Regular uterine contractions >4/10 minutes (patients perceived abdominal palpation).
B. Assessment of cervical length (per vaginal examination).
C. Vaginal bleeding (per vaginal examination).

Low Birth Weight

Low birth weight is defined as infant having weight < 2500g, very low birth weight <1500g and extremely low birth weight <1000g.

MATERIAL AND METHODS

Study design

Descriptive case series.

Setting

Outpatient Department of Obstetrics and Gynaecology, Combined Military Hospital, Quetta, a tertiary care hospital.

Duration of study

Study was carried out over a period of six months from 01-05-2009 to 01-11-2009.

Sample size

Sample size was calculated by using WHO sample size calculator with 95% confidence interval. Anticipated population proportion P=12.1% [3]. Absolute precision d=0.06%. Sample size=114.

Sampling technique

Non-probability purposive sampling

Sample selection

Inclusion Criteria

- Singleton pregnancy
- Normal fetal lie.
- Primigravida
- Age >18 and <35 years
- Height 5 feet or more

Exclusion Criteria

- Patients with uterine anomalies (uterine polyp, uterine septae, submucosal fibroid).
- Smoking
- Short stature
- Other medical disorder like diabetes, hypertension, thyroid disorders, epilepsy and asthma.

DATA COLLECTION

114 pregnant women at 16 weeks of gestational age with

singleton pregnancy reporting to the Antenatal Clinic, Obstetrics and Gynaecology Department Combined Military Hospital, Quetta were selected. Administrative permission from concerned authorities and ethical committee was sought. Women were informed about the study followed by informed written consent from couple. Demographic data were collected regarding age, maternal residence and socioeconomic status. A detailed history was taken from each patient and relevant clinical examination was done. Confounding variables were controlled by taking history of diabetes, hypo or hyperthyroidism, asthma, hypertension and presence of conditions like polyhydramnios, grandmultipara. Patients were specifically questioned through questionnaire regarding gestational age, baseline height, weight age group, parity. Height was measured by using charts fixed on wall, same chart was used for all women.

Weight was measured by using same weight machine (without error) throughout antenatal checkups. Weight and height was measured by same person and rechecked by senior to avoid bias. There pregnancies were followed to assess the outcome in terms of preterm labour and low birth weight. No special interventions were made during the pregnancy. The neonatologist evaluated the babies. All data were recorded in proforma attached as annexure-A.

DATA ANALYSIS

All the data were entered in SPSS version 15.0 for analysis. Mean±SD was calculated for age (years), gestational age (weeks), weight (Kg) height (meter square). Frequencies and percentages were calculated for maternal outcome (preterm delivery, Uterine contractions >4/10 min, Cervical dilatation > 2cm and Vaginal bleeding) Frequencies and percentages were also calculated for fetal outcome in terms of weight (<2.5kg and 2.5 to 4kg).

RESULTS

Distribution of cases by age shows, 16 (14.0) patients were 19 years old, 46 (40.4%) patients were between 20-25 year, 42 (36.9%) patients were between 26-30 year and 31-34 year old patients were 10 (8.7%) with mean age of 27.6±3.9 year (Table-I).

Table-I. Distribution of cases by age

Age (year)	Number	%age
19	16	14.0
20-25	46	40.4
26-30	42	36.9
31-34	10	08.7
Total	114	100.0
Mean±SD	27.6±3.9	

Out of total 114 patients, 15 (13.1%) belonged to < 37 weeks of gestation while 99 (86.9%) patients had >37 weeks gestation. Mean gestational age observed 38.5±4.1 (Table-II).

Table-II. Distribution of cases by gestational age

Gestational age (week)	Number	%age
<37	15	13.1
≥37	99	86.9
Total	114	100.0
Mean±SD	38.5±4.1	

Out of 15 preterm deliveries, 10 (66.7%) had uterine contractions >4/10 min and 5 (33.3%) patients had Cervical dilatation >2cm (Table-III).

Table-III. Maternal outcome in preterm delivery (n=15)

Maternal outcome	Number	%age
Uterine contractions >4/10 min	10	66.7
Cervical dilatation >2cm	05	33.3
Vaginal bleeding	-	-
Total	15	100.0

Out of 114 patients, 12 (10.5%) cases had fetal weight <2.5 kg and while remaining 102 cases (89.5%) had fetal weight 2.5-4 Kg (Table-IV).

DISCUSSION

In present day health care, there is growing concern about resource allocation and their uses. Low BMI as a risk factor for preterm birth and low birth weight is not a new issue. Increased rate of preterm delivery means

Table-IV. Distribution of cases by fetal weight (n=114)		
Weight (Kg)	**Number**	**%age**
<2.5 Kg	12	10.5
2.5-4 Kg	102	89.5
Total	114	100.0

more expensive specialized care for the baby and increasing health care costs.

In present study, out of 114 patients(with BMI<19), 15 (13.1%) patients presented with preterm labour and 12(10.5%) patients gave birth to fetus with weight <2.5kg. From a recent prospective study conducted in antenatal clinics in Mwanza by Watson-Jones et al, a prevalence of as low as 8% LBW and 12% preterm birth has been reported[10].

The maternal age range was 19-34 year with a mean age of 27.6±3.9 years. In 16 cases (14.0%) maternal age was <19 years, in 98 (86.0%) cases it was <35 years. These results are verified by a study conducted on maternal age. These results showed 86.8% women were below 35 years[11].

Another study showed that low BMI has been associated with increased risk of preterm delivery, low birth weight and a decreased incidence of pre-eclampsia gestational diabetes, obstetric intervention and postpartum haemorrhage[12].

A study conducted by Kalk et al showed that pregnancy outcome is worst in babies from mothers with low BMI as compared to healthy weight mothers with respect to increased incidence of preterm birth lower birth weight and increased neonatal mortality[13].

Another study showed that underweight mothers were more likely to experience a preterm delivery. Severely thin mothers with very low and very high pregnancy weight gain were at the greatest risk for spontaneous preterm birth. For all preterm births, the risk among underweight mothers increased with ascending underweight severity. It highlights the importance of pre-conceptional counseling for women specifically the importance of women achieving or maintaining a normal weight status[14].

Low birth weight continues to remain a major cause of mortality and morbidity in children around the world with an admission rate of 55.4%[15]. There are numerous maternal, placental, and fetal risk factors. Babies with low birth weight encounter complications more frequently than normal weight babies. Low birth weight infants have 3-4 times greater risk of dying from diarrhoeal disease and acute respiratory infections as compared to normal birth weight infants[16].

Low birth weight (LBW) is a known problem worldwide[17] and appears to be much more pronounced in developing countries. In Tanzania, the prevalence of LBW is about 16%–19%[18], whereas among adolescents only, it has recently been reported to be about 48%[19] while in present study, low birth weight (<2.5 kg) was observed in 49.1% cases.

Low BMI together with small pregnancy weight gain rate is an important risk factor for LBW[20].

A pregnant woman's weight is an extremely important factor in the course of pregnancy and delivery. The frequency of preterm deliveries as well as low neonatal birth weight <2.5 Kg in underweight mothers was higher than other groups[21].

A study was carried out in Japanese women showed that in underweight women the risk of low birth weight infant and hospitalization of infant were elevated significantly[22].

In literature, LBW is a multi-factorial problem that incorporates important factors as early pregnancy ⩽ 19 years, malaria, anemia, multiple gestations (twins, etc), Edema-proteinuria-hypertension (EPH) ghestosis, infections: urinary tract infections, recurrent bacterial infections, sexually transmitted infections (STI), human immunodeficiency viral (HIV) infection, intestinal parasitic infections, long standing poor nutritional status of the mother, smoking, physically demanding work during pregnancy, and poverty[23].

The most stressful events were related to family illness, martial disruption, violence or financial distress. Some risk factors cannot be modified (previous preterm labour, low birth weight) while preventive efforts should be directed towards attaining BMI >20 before conception, modifying worse conditions during current pregnancy and appropriate management of acute emotional stress[24].

The association between low BMI and preterm labour all pointed to the importance of maternal physique as a determinant of fetal size, which in turn could be controlled by the length of gestation at delivery[25].

It is a known fact that maternal weight is one of the important determinants of low birth weight. Several studies have indicated that preterm delivery rate is higher among those who have low BMI. The cervical length of women with BMI of >25 was longer than those with a BMI of 23 or less. The mean cervical length in women with low BMI was significantly lower compared to subjects with normal or high BMI[26].

It is suggested that in order to prevent preterm labour and IUGR a combined effort is required as early as possible prior to conception. It is essential that nutritional status should be optimized. Underweight status before pregnancy and inadequate weight gain during pregnancy independently increases the risk of preterm labour and IUGR[27].

The limitations of this study are that 114 patients were studied over a period of 6 months. As the families of soldiers and officers are entitled for free medical facilities, and most of our patients were residing at accessible distance from hospital, so results of this study are not representative of general population.

CONCLUSIONS

In conclusion, this study demonstrates that low BMI is associated with preterm delivery and low birth weight babies.

Preterm birth and low birth weight are significant cost factors which burden the healthcare system. Maternity services must recognize the importance of this and establish strategies and reliable systems that accurately identify BMI and provide appropriate antenatal management pathway to reduce the incidence of adverse outcomes. Provision of antenatal care should be uniform and optimal. Adequate nutrition is critical for fetal development.

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